

# Electro-Voice®



## FM-12C

### Floor Monitor Speaker System

- Coaxial speaker with Super-Dome™ tweeter
- 35°, 45° and 50° system orientations
- 200-watt long-term power handling
- PRO™ circuit high-frequency protection

#### SPECIFICATIONS

Frequency Response, 10 Feet on Axis, Swept One-Third-Octave, Half-Space Anechoic Environment (see Figure 1; curve shown normalized for 1 watt/1 meter):

100-18,000 Hz

Low-Frequency 3-dB-Down Point: 100 Hz

Usable Low-Frequency Limit (10-dB-down point): 80 Hz

Half-Space Reference Efficiency: 2.8%

Long-Term Average Power-Handling Capacity per EIA Standard RS-426A (see Power-Handling Capacity section): 200 watts/800 watts (short term)

Maximum Woofer Acoustic Output: 5.7 watts

Sound Pressure Level at 1 Meter, 1 Watt Input, Anechoic Environment, Band-Limited Pink Noise Signal, 300-2,000 Hz: 99 dB

Dispersion Angle Included by 6-dB-Down Points on Polar Responses, Indicated One-Third-Octave Bands of Pink Noise (see Figure 3):

250-20,000 Hz Horizontal: 110° ±70°

5,000-20,000 Hz Vertical: 60° ±30°

Directivity Factor R<sub>1</sub>(Q), 800-16,000 Hz Median (see Figure 4): 12.4 (+29.2, -10.9)

Directivity Index D<sub>1</sub>, 800-16,000 Hz Median (see Figure 4): 9.8 dB (+6.4 dB, -8.3 dB)

Distortion, 0.1 Full-Power Input, Second Harmonic, 100 Hz: 5.0%

1,000 Hz: <1%

10,000 Hz: <1%

Third Harmonic, 100 Hz: 1.0%

1,000 Hz: 5.0%

10,000 Hz: 1.0%

Distortion, 0.01 Full-Power Input, Second Harmonic, 100 Hz: <1%

1,000 Hz: <1%

10,000 Hz: 1.0%

Third Harmonic, 100 Hz: <1%

1,000 Hz: 3.0%

10,000 Hz: <1%

Trenducor Complement:

12-inch low-frequency driver, EVM®/FORCE® hybrid with a 2 1/2-inch flat-wire voice coil; 1 1/2-inch Super-Dome™ high-frequency driver coupled to 5-inch Direktor™

Crossover Frequency:

1,200 Hz

Crossover Slope:

12 dB per octave

Impedance,

Nominal:

8 ohms

Minimum:

7.7 ohms

#### Input Connectors:

Two 3/4-inch phone jacks wired in parallel (allows paralleling of multiple speakers)

#### Enclosure Materials and Colors:

Sealed, one-piece molded black textured polyethylene enclosure

#### Dimensions:

Height:

41.4 cm (16.3 in.)

Width:

45.7 cm (18.0 in.)

Depth:

39.1 cm (15.4 in.)

#### Net Weight:

13.4 kg (29.5 lb)

#### Shipping Weight:

15.5 kg (34.0 lb)

#### DESCRIPTION

The compact Electro-Voice FM-12C is a 200-watt, two-way, medium-to-high efficiency, constant-directivity stage vocal monitor. Possible system orientations are at 35°, 45° and 50° to the floor. Its unique coaxial design provides wide-range response and exceptionally small size.

The enclosure is one-piece molded black textured polyethylene utilizing a special molding technique. This technique yields a wall thickness similar to wood cabinets, a rigid structure that is virtually indestructible and a finish that is impervious to nearly all chemicals. The small size (1.25 cubic feet), light weight (29.5 lb) and convenient molded-in handle at the cabinet's center of gravity make it ideal to carry or set up.

The high-frequency section of the FM-12C utilizes a beamwidth-stabilizing Direktor™ coupled to EV's exclusive high-power-capacity, wide-beamwidth, Super-Dome™ high-frequency driver for the range 1,200- to

FIGURE 1 — Axial Frequency Response 1 Watt/1 Meter

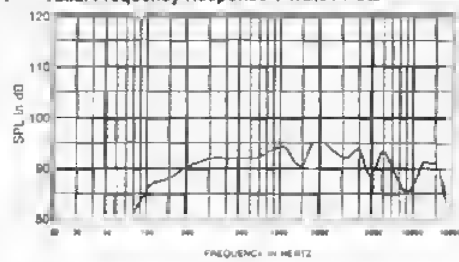


FIGURE 2 — Polar Response  
( $1/3$ -octave pink noise, 4 volts/10 feet)

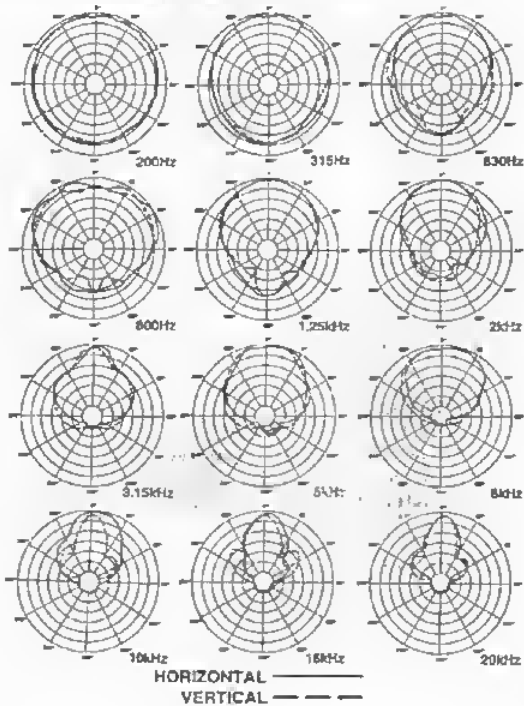


FIGURE 3 — Beamwidth vs. Frequency Whole Space  
(anechoic)

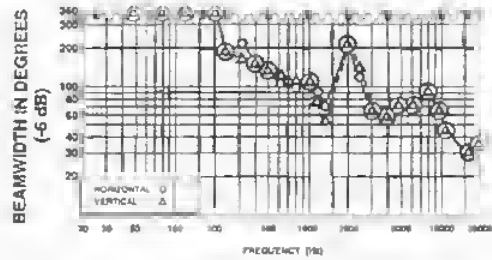
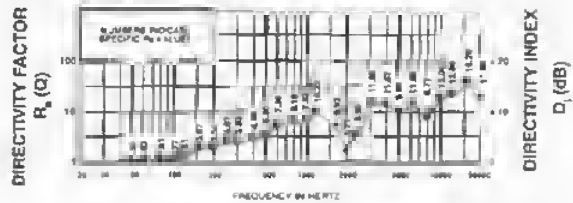


FIGURE 4 — Directivity vs. Frequency Whole Space  
(anechoic)



18,000-Hz. This combination is mounted coaxially on an especially designed die-cast frame 12-inch low-frequency driver.

The bass section of the FM-12C is a derivative of the EVM® and FORCE® loudspeaker families. It features a low-mass, edge-wound, 2½-inch-diameter voice coil with beryllium copper lead wires, coated with proprietary high-temperature materials. The polyimide voice-coil former and the pole piece of the motor structure are vented for increased cooling capabilities under high-power input conditions. The voice coil is driven by a nine-pound magnetic structure mounted to a rigid, yet lightweight, eight-spoke, die-cast aluminum frame for further heat sinking.

#### THE PRO CIRCUIT

A self-resetting, high-frequency protection circuit is incorporated into the FM-12C crossover network to prevent against accidental over-drive and improve system reliability. If the input power to the high-frequency section exceeds the nominal rating, the protection circuit is activated, reducing the power delivered to the driver by 6 dB. The system will remain in this mode of operation until the input power is reduced to a safe level.

#### FREQUENCY RESPONSE

The combination of a 12-inch low-frequency driver, wide-bandwidth, Super-Dome™ high-frequency driver plus Direktor™ and an equalized crossover results in the wide and smooth overall response shown in Figure 1. This response was measured at 10 feet, using a 4-volt input in an anechoic chamber. The response is one-third-octave averaged. No external equalization was used.

#### DIRECTIVITY

A unique feature of the FM-12C is the constant-directivity dispersion provided by the Direktor™. The polar response of the system at selected one-third-octave bandwidths is shown in Figure 2. These polar responses were measured in an anechoic environment at 10 feet using one-third-octave pink-noise inputs. The frequencies selected are fully representative of the polar response of the system. Beamwidth of the system utilizing the complete one-third-octave polar data is shown in Figure 3.  $R_p$  (Q) and directivity index (D) are plotted in Figure 4.

#### POWER-HANDLING CAPACITY

To our knowledge, Electro-Voice was the first U.S. manufacturer to develop and publish a power test closely related to real-life conditions. First, we use a random-noise input signal because it contains many frequencies simultaneously, just like real voice or instrument program. Second, our signal contains more energy at extremely high and low frequencies than typical actual program, adding an extra measure of reliability. Third, the test signal includes not only the overall "long-term average" or "continuous" level—which our ears interpret as loud-

nass—but also short-duration peaks which are many times higher than the average, just like actual program. The long-term average level stresses the speaker thermally (heat). The instantaneous peaks test mechanical reliability (cone and diaphragm excursion). Note that the sine-wave test signals sometimes used have much less demanding peak value related to their average level. In actual use, long-term average levels exist from several seconds on up, but we apply the long-term average for several hours, adding another extra measure of reliability.

Specifically, the FM-12C is designed to withstand the power test described in the revised EIA Standard RS-426A. The EIA test spectrum is applied for eight hours. To obtain the spectrum, the output of a white-noise generator (white noise is a particular type of random noise with equal energy per bandwidth in Hz) is fed to a shaping filter with 6-dB-per-octave slopes below 40 Hz and above 318 Hz. When measured with the usual constant-percentage bandwidth analyzer (one-third-octave), this shaping filter produces a spectrum whose 3-dB-down points are at 100 Hz and 1,200 Hz with a 3-dB-per-octave slope above 1,200 Hz. This shaped signal is sent to the power amplifier with a continuous power set at 200 watts into 6.0 ohms EIA equivalent impedance (34.7 volts true rms). Amplifier clipping sets peaks at 6 dB above the continuous power, or 800 watts peak (78.0 volts peak). This procedure provides a rigorous test of both thermal and mechanical failure modes.

#### GRILLE REMOVAL

The grille assembly of the FM-12C is fastened to the enclosure using four #8 x 1½-inch screws. The grille assembly can be quickly and easily removed by using a Phillips screwdriver, allowing access to the drivers or to rotate the grille so the orientation of the Electro-Voice logo can be changed.

#### ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The voice-and-music speaker system shall consist of a 12-inch coaxial speaker combination in a one-piece, molded black textured polyethylene enclosure. It shall exhibit a 300- to 2,000-Hz frequency response with sensitivity of no less than 99 dB (1 W/1 m, 300- to 2,000-Hz band-limited pink noise). It will be capable of handling 200 watts of power by testing described in the revised EIA Standard RS-426A, and produce vertical and horizontal beamwidths (6-dB-down including angle) of 100°, deviating no more than 60° from this angle over the frequency range of 1,000 to 10,000 Hz. The speaker system shall be 41.4 cm (16.3 in.) high, 45.7 cm (18.0 in.) wide, 39.1 cm (15.4 in.) deep and weigh no more than 13.4 kg (29.5 lb).

The loudspeaker system shall be the Electro-Voice FM-12C.

#### WARRANTY (Limited)

Electro-Voice products are guaranteed against malfunction due to defects in materials or workmanship for a specified period, as noted in the individual product-line statement(s) below, or in the individual product data sheet or owner's manual, beginning with the date of original purchase. If such malfunction occurs during the specified period, the product will be repaired or replaced (at our option) without charge. The product will be returned to the customer prepaid. **Exclusions and Limitations:** The Limited Warranty does not apply to: (a) exterior finish or appearance; (b) certain specific items described in the individual product-line statement(s) below, or in the individual product data sheet or owner's manual; (c) malfunction resulting from use or operation of the product other than as specified in the product data sheet or owner's manual; (d) malfunction resulting from misuse or abuse of the product; or (e) malfunction occurring at any time after repairs have been made to the product by anyone other than Electro-Voice or any of its authorized service representatives. **Obtaining Warranty Service:** To obtain warranty service, a customer must deliver the product, prepaid, to Electro-Voice or any of its authorized service representatives together with proof of purchase of the product in the form of a bill of sale or receipted invoice. A list of authorized service representatives is available from Electro-Voice, Inc. at 600 Cecil Street, Buchanan, MI 49107 (616/695-6831 or 800/234-6831). **Incidental and Consequential Damages Excluded:** Product repair or replacement and return to the customer are the only remedies provided to the customer. Electro-Voice shall not be liable for any incidental or consequential damages including, without limitation, injury to persons or property or loss of use. Some states do not allow the exclusion or limitation of incidental or consequential damages so the above limitation or exclusion may not apply to you. **Other Rights:** This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

**Electro-Voice Speakers and Speaker Systems** are guaranteed against malfunction due to defects in materials or workmanship for a period of five (5) years from the date of original purchase. The Limited Warranty does not apply to burned voice coils or malfunctions such as cone and/or coil damage resulting from improperly designed enclosures. Electro-Voice active electronics associated with the speaker systems are guaranteed for three (3) years from the date of original purchase. Additional details are included in the Uniform Limited Warranty statement.

Service and repair address for this product: Electro-Voice, Inc., 600 Cecil Street, Buchanan, Michigan 49107 (616/695-6831 or 800/234-6831).

Specifications subject to change without notice.